The Psychological Implausibility of Naturalized Content

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Abstract

Conceptual Atomism (CA) is the view that most concepts are represented psychologically as atoms, with no internal structure and CA Atomism on its own is a psychological/semantic theory, but from its inception, it has been mixed up with the separate, meta-semantic project of naturalizing content. I will show that this combined project is forced to end in the self-defeating position of positing non-atomic structures for a large number of concepts. I suggest that a better way out would be to separate the two projects, and allow each to develop on its own.

Introduction

For the last two decades, a number of psychologically minded philosophers have been pursuing a project aimed at naturalizing mental content (Dretske, 1981; 1986; Fodor, 1987; 1990; Millikan, 1984; 1989; 1990). This is a meta-semantic project that seeks an explanation of how meaningful states can arise from non-meaningful ordinary matter. The leading players in this project are also proponents of Conceptual Atomism, the view that concepts are atoms, with no internal structure or necessary relations to other concepts. Conceptual Atomism is a psychological/semantic project, for which the project of naturalizing mental content is supposed to provide a meta-semantics. This combined project – call it Naturalized Conceptual Atomism (NCA) – is still very much a going concern today (Fodor, 1998; Laurence and Margolis, 1999; Margolis 1998; Millikan, 1998; Usher 2001).

The meta-semantic project has a big problem with what I will call 'unacquainted content' (defined below). Proposed solutions to this problem either do not work, or lead to a psychological/semantic position that proponents of NCA have explicitly rejected in the past – namely, that a large number of lexical primitives correspond to complex (non-atomic) concepts. I will look at the three main attempts to naturalize mental content and show how they all either fail or lead to a non-atomic structure for large numbers of concepts. The remedy for this situation, as I see it, is to separate the meta-semantic project from the psychological/semantic project, and let each develop, for the time being, independently of the other.

A Few Definitions

Concept

Following the standard psychological usage, I am using the term 'concept' to mean a sub-propositional mental representation. (This is in contrast to the standard philosophical usage in which a concept is more like an abstract object.) For the present purposes, I will stick to examples of concepts (mental representations) that are about objects or natural kinds.

Unacquainted Content

Unacquainted content is the Achilles heel of NCA. It is the kind of content that a concept has if its bearer has had no direct experience with the represented object or kind. For example, anyone who has experience with dogs (i.e. almost everyone reading this) will have a normal DOG concept. But most North Americans who have heard of, but never directly experienced, wombats have a WOMBAT concept with unacquainted content.[1]

The term 'unacquainted content' also covers many kinds of hypothesized, future or fictional content. For instance the concept, UNICORN, has unacquainted content because the concept bearers could not possibly have directly experienced the nonexistent objects to which it refers.

Nonexistent Object

Nonexistent objects are what concepts with unacquainted content seem to refer to. Maybe nonexistent objects are objects in possible worlds, maybe they have some kind of Meinongian nonexistent being,[2] or maybe they don't exist at all and references to them are vacuous. I don't intend to take a position on this ontological issue, because the main question of the paper is not whether there are unicorns, but whether there are UNICORNs (atomic representations for unacquainted content).[3]

The Problem of Unacquainted Content

The main proponents of NCA are Dretske, Millikan and Fodor. All three are engaged in a philosophical project that seeks (a) a naturalized account of (b) external content, and all three tend to assume that (c) concepts are atoms with no internal structure. Their three different brands of NCA differentiate around (d) the special problems posed by misrepresentation. I will briefly discuss these four points of agreement and then I will discuss the differences between

[1] A word in small caps (e.g. WOMBAT) refers to a concept, while a word in single quotes (e.g. 'wombat') refers to a lexical item.
[2] Alexius Meinong was the German philosopher and psychologist credited with proposing this solution (Meinong, 1904).
[3] My hunch is that everyday common sense is pseudo-Meinongian, and therefore my description of a unicorn as a nonexistent object will be perfectly intelligible to all but the most dogmatic readers.

the three proposals, focusing on the special problem posed by unacquainted content.[4]

(a) A Naturalized Account. To naturalize content would be to find a coherent story to tell about how the intentional nature of concepts arises from the non-intentional nature of ordinary matter. In practice this has typically meant grounding the meaning of a symbol in some kind of causal or information-bearing relationship between the symbol and the object it represents.

(b) External Content. Proponents of NCA follow Putnam (1975) in insisting that there has to be an external or broad component to representational content. Meaning is not (only) in the head.

(c) Conceptual Atomism. Dretske, Millikan, and Fodor all make the assumption that concepts and other meaningful mental states must be both syntactically and semantically atomic. A concept simply refers to an object in the world. Semantically speaking, no part of a concept's meaning derives from any relationship it may have with other concepts. Syntactically speaking, if the concept had an internal structure of some kind, it would raise the question of what the individual parts of the structure refer to, and it's doubtful whether that is even a meaningful question to ask in this context. If, for example, DOG is satisfied by all and only dogs because of a causal relationship between DOGs and dogs, then there is just no internal structure in the equation that needs to be explained.

(d) Misrepresentation. If the meaning of DOG is just dog, and if DOG gets its meaning in virtue being caused by dogs, what do we do with the fact that sometimes DOG tokens might be caused by things other than dogs? For example, a cat on a dark night might cause a DOG token. If so, this seems to imply that DOG means the same as 'dog or cat on a dark night', which is intuitively wrong. In fact, this "disjunction problem" is much bigger than that. Pictures of dogs can also cause DOG tokens. So can the word 'dog', thoughts about pets, and so on. So the meaning of DOG, on this account, would actually be an infinite disjunction including things like dogs, cats on dark nights, 'dog' tokens, PET tokens, LEASH tokens, and so on. It is in attempting to solve this problem that the three accounts proposed by Dretske, Millikan and Fodor diverge.

Dretske on Misrepresentation

Dretske was the first to formulate a version of NCA built on information theory (Dretske, 1981). According to this approach, a concept C represents some X in the world only if C carries information about X. More specifically, if X and only X causes C then C represents X. The formulation is meant to be counterfactual supporting. So if X and only X *would cause* C, then C represents X. Left like this, Dretske's theory suffers from the disjunction problem as badly as any causal theory possibly could – the condition that only X would ever cause C is far too strong to apply to real cognitive agents in noisy environments.

Dretske's proposed solution (Dretske, 1986)[5] begins by making a distinction between simple and complex organisms. Simple organisms have only one route to a representational state. As an example, he points to marine bacteria that contain magnetic sensors called magnetosomes. These sensors detect the surrounding magnetic field and allow the bacterium to align itself with magnetic north. Since in the northern hemisphere, the lines of the magnetic field are inclined downwards, the bacterium can use the signal from its magnetic sensors to swim upwards or downwards in the water. The bacteria die in the oxygen-rich water close to the surface, so bacteria living in the north are naturally selected to use their sensors to swim downwards (towards magnetic north). If they are transplanted to the southern hemisphere where the field lines incline upwards, they will kill themselves by swimming into oxygen-rich water.

Dretske thinks that simple organisms like the magnetosome bacteria cannot accidentally misrepresent, because the information contained in whatever representations they form is ambiguous. In its natural environment, the bacterium's magnetosome representations reliably causally covary with the direction of oxygen-free water. Hence it is tempting to say that when the bacterium is moved to the southern hemisphere, it begins to misrepresent that direction. But on the other hand, the magnetosome representations also reliably causally covary with the direction of magnetic north, and this does not change no matter where on earth the bacterium is moved to. So on this latter view, it is not a case of misrepresentation that causes the northern bacteria to kill themselves when moved to the south. The magnetosome mechanism still reliably indicates magnetic north, but something else is going wrong inside the organism that causes it to swim in that direction and kill itself. Dretske concludes from this that where there is only one causal route to a representation, misrepresentation cannot occur because the informational content of the representation (i.e. what the representation is *supposed* to mean) is indeterminate. Unless it is possible to unambiguously determine a representation's informational content, it is not possible to determine whether it has been tokened in error.

In more complex organisms, there can be more than one route to a representation. For instance, a human being can detect a hamburger by seeing it, smelling it, tasting it, feeling it, and so on. There are multiple sensory routes that end in the same representation, H. If, on the contrary, one could only detect a hamburger by smelling it, H would reliably causally covary with both the hamburger and the

[4] Sometimes the term 'misrepresentation' is used to include representations of nonexistent objects and states of affairs as well as representations tokened in error. But nonexistent objects are a kind of unacquainted content. So for my purposes, a misrepresentation is a representation that was supposed to correctly represent an existing object or state of affairs, but, for some reason, failed to do so.

[5] In later work, Dretske (1988) pursued a different solution that shares more in common with Millikan's approach, discussed below.

odor. So the content of H, on Dretske's story, would be indeterminate. But since there are at least four sensory routes (in a human) to H, the content can be fixed. A token of H caused by seeing a hamburger does not causally covary with the odor of the burger, so the odor can be ruled out as part of H's content. Now we can see how misrepresentation is possible. Any one of the senses can be tricked into causing a token of H when there is no hamburger present, but since the content of H is fixed by the intersection of multiple causal routes, the resulting token H can sensibly be considered to accidentally misrepresent.

Dretske and Unacquainted Content

Information-based NCA of this kind suffers from a big problem with unacquainted content. In Dretske's version, the problem is, in many cases, one of indeterminacy. Take Jay Leno, the host of the tonight show. Like most people with a LENO concept, I have watched him for hours on TV. I know both what he looks like and what he sounds like, so I have two causal routes to my LENO concept. If I ever saw Jay Leno in person, it's reasonable to suppose my LENO concept would be tokened through one or more of these causal routes. So the condition that Leno would cause LENO tokens is satisfied. But the condition that *only* Leno would cause LENO tokens is violated – recordings of Leno also cause LENO tokens. Unfortunately, the multiple causal routes story is no help here because I have only two causal routes to LENO tokens and they would both be engaged whether I saw him live or on TV. It's possible that this problem can be set aside by noting that there is a causal relationship of some sort between the real Leno and the TV Leno, but going down this road will likely produce more problems than it solves. There is a causal relationship between a certain type of bacteria and pimples, but it should not follow, at least in any Conceptual Atomist story, that any part of the content of my PIMPLE concept is a type of bacteria.

The problem gets worse when there is no possibility at all of a direct sensory causal route to a token, as is the case for nonexistent objects like the fictional detective, Sherlock Holmes, or the Second Shooter hypothesized in certain theories about the assassination of John F. Kennedy.[6] I do know a lot of facts about what these two nonexistent objects are, having heard the conspiracy theory about the Kennedy assassination and read the stories about Sherlock Holmes. But it does not follow that either of these individuals (should they turn out to exist after all) would cause appropriate tokenings in me if I ever saw them, because I have no history of a direct sensory link with them, and therefore no tokens with the appropriate informational content.

[6] I have no opinion about these theories. Let's just say for the sake of argument that there was no Second Shooter.

Millikan on Misrepresentation

Millikan approaches the problem of misrepresentation from another direction. One way of looking at misrepresentation is to say that it arises when a given representation fails to perform its proper function. For example, if DOG is tokened in response to a cat, we can intuitively say that the mechanism that outputs DOG tokens has failed to do its job properly. The DOG token is only supposed to represent dogs, but it is being tokened (in this case, accidentally) in response to a cat. So all the approaches to explaining misrepresentation within a theory of NCA have in common that they want to find some naturalistic way to describe the proper function of a given representation. Millikan meets this challenge head on by trying to find a teleological solution rooted in the theory of natural selection (Millikan 1984; 1989; 1990; also see Dretske, 1988).

Consider the human heart. Intuitively, we would like to say that its proper function is to circulate blood, but where do we get the authority to say such a thing? Millikan answers that we can say the heart has the function of circulating blood if we can show that's what hearts were naturally selected for. Applying this idea to mental representations, Millikan suggests that we can say that, for instance, DOG refers to dogs if we can show that's what DOG tokens were naturally selected for.

To determine what a representation was selected for, Millikan urges us to focus on the systems within the organism that make use of the representation (Millikan, 1989). For example, the representations produced by the navigation mechanism within a magnetosome bacterium are consumed by some other part of the organism that uses the information to pick the current swimming direction. If we assume that these various mechanisms were selected for their ability to propel the bacterium away from oxygen-rich water, then the proper function of the magnetosome representations must be to represent the direction of such water. So when we transplant the bacterium, it can truly said to be Accidentally Misrepresenting that direction. Millikan's solution has the advantage of allowing us to say what we intuitively want to say about the bacteria – that in normal conditions they represent, and in abnormal conditions they misrepresent.

A tempting way of looking at this solution is that it is the same as Dretske's information-based solution, but with the causal covariation occurring on an evolutionary time scale rather than over the lifetime of a single organism. In fact, Dretske (1981: 234) does toy with the idea of innate representational content produced in just such a way – representations that are selected for the informational content they carry. But reflection on the case of the magnetosome bacteria shows the real difference in the two theories. Recall that Dretske (1986) was forced to conclude that the content of the magnetosome mechanism's representations were indeterminate – there were just too many things the representations causally covaried with to judge which was the 'proper' informational content. Exactly the same argument would apply on an evolutionary scale.

But by focusing on the naturally selected proper function of the representations, Millikan avoids this indeterminacy.

Millikan and Unacquainted Content

As appealing as Millikan's solution to misrepresentation may seem, it has problems with unacquainted content that are at least as bad as those associated with Dretske's approach. As Dretske himself has pointed out (Dretske, 1986), the theory cannot explain representational content for anything that a species either has not encountered during its evolutionary history, or has encountered but had no need or use for. If no member of the species, or any ancestor species, ever encountered a particular type of object, then no part of the organisms that comprise that species could possibly have been selected for the purpose of representing that content. This denies representational content to almost any representation of a nonexistent object, and many representations of real things such as works of art, new pieces of technology, or anything that is recent enough to have played no role in the evolutionary history of the species. Millikan has a problem with unacquainted content on an evolutionary scale.[7]

Fodor on Misrepresentation

Arguably, the most promising version of NCA comes from Fodor (1987; 1990; 1994; 1998). For the last 15 years or so, he has been pushing a theory of Asymmetric Causal Dependence (ACD) theory to explain how an information-based semantics could deal with, among other things, misrepresentation.[8] In his essay, "A theory of content II", he combines Dretskian informational semantics (a concept C means X if it's a law that X's cause C's) with an a symmetric dependence condition (Y's that cause C's only do so because X's cause C's and not vice versa). This takes care of misrepresentations such as cats on dark nights causing DOG tokens (this state of affairs is dependent on dogs causing DOG tokens but not the other way around), and it is also extendible to explain various kinds of "robust" tokenings (non-X-caused C tokenings that are nevertheless not error cases – for instance, DOG tokens that are caused by pictures of dogs or thoughts about leashes.)[9]

[7] It could be objected that the representation of hypothetical or nonexistent things *in general* is very useful, and thus could have been selected for. But Millikan's theory is supposed to provide an explanation for the specific content of specific representations, and this is what it fails to do for unacquainted content.

[8] Lately, Fodor (1998) prefers to talk about concept acquisition as a process of "locking on" to a relevant property. The new formulation addresses some concerns about nativism and ontology, but Fodor is clear that however locking on works, the meaning of the resulting concept is still grounded in an informational relationship, and ACD remains his most mature attempt to characterize that relationship.

[9] Note that I am actually describing what Fodor (1990) called the "pure" version of ACD. He also suggests the possibility of a "mixed" version in which he adds the condition that C must have actually been caused by X at least once. This mixed version will obviously fail for unacquainted content, so I will only deal with pure ACD here. And to be fair, Fodor (1994: Appendix B) has made it pretty clear that he doesn't think much of the mixed theory anyway.

Fodor and Unacquainted Content

The problem of unacquainted content for pure ACD is immediately apparent, particularly for nonexistent objects. For example, how can non-unicorn-caused tokenings of UNICORN be asymmetrically dependent on unicorn-caused tokenings when there are no existing unicorns? Fodor thinks that this objection can be answered, by reminding us that, like Dretske, he is telling a nomic story:

> It can be true that the property of being a unicorn is nomologically linked with the property of being a cause of UNICORNs even if there aren' t any unicorns… There wouldn't be non-unicorn-caused UNICORN tokens but that unicorns would cause UNICORN tokens if there were any unicorns. (Fodor, 1990, p101, italics removed and single quotes changed to small caps for consistency).

Fodor has been attacked on the unicorn front before. For instance Baker (1991) constructed a detailed argument based on unicorns and "shunicorns" (a creature of her own design) that requires us to speculate about which of various possible worlds containing unicorns and/or shunicorns is "closer" to our own. If your mind boggles at this kind of talk, I will now offer what I hope is a slightly simpler explanation below for why unicorns are a big thorn in the side of the pure version of ACD.

In this unicorn-free world, all valid UNICORN tokenings must be robust tokenings – they are caused by things other than unicorns. The acquisition of the concept UNICORN in the absence of unicorns comes from exposure to representations (visual or verbal) of unicorns. Having learned about unicorns from books and stories, if a unicorn suddenly popped into existence in front of you, it would likely cause a UNICORN token. So we have two valid causal routes to UNICORN tokens: one from representations of unicorns, and one from possible real unicorns that you might encounter in the future (if unicorns began to exist). To apply ACD, we have to know what would happen if we broke either of these two causal links. Would breaking the causal link between future unicorns and UNICORN tokens break the link between representations of unicorns and UNICORN tokens? My intuition is that this scenario doesn't even make sense, but suppose for the sake of argument that breaking the unicorn/UNICORN link would break the representation/UNICORN link. Then UNICORN tokens are causally dependent on (future) unicorns.

But what would happen if we broke the causal link between representations of unicorns and UNICORN tokens? According to ACD, if UNICORN is to mean unicorn, then this should not affect the causal link between future unicorns and UNICORN tokens. But it obviously does. In a world without unicorns, if you don't learn about them from representations of them then you don't learn about them at all. This means that if a unicorn suddenly popped into existence in front of you, you wouldn't know what it was. Maybe it would cause tokens of HORSE, HORN or whatever,

but it wouldn't cause a UNICORN token because you wouldn't have one for it to cause. So in the best case, causal dependence runs both ways and ACD doesn't apply. In the worst case (where you don't buy the story about breaking the link between future unicorns and UNICORN tokens) ACD runs in the wrong direction and UNICORN ends up having representations of unicorns as its content. But this must be false – UNICORN has unicorns as it's content.[10] Notice that you can run exactly the same argument for any type of unacquainted content, such as my LENO concept. Tokenings of LENO in the presence of Leno are causally dependent on tokenings of LENO in response to representations of Leno.

There is a way out of this trap for an extreme radical nativist. Fodor (e.g. 1998) entertains, though he does not endorse, the possibility that we are born with a stock of atomic concepts waiting to be triggered by the right sort of content-fixing experiences. Applying this idea to unacquainted content, if we all have built-in UNICORN token types that just need to be "triggered" somehow, then maybe our first encounter with a unicorn would cause a UNICORN token after all. Of course we wouldn't have a word for this token, but that is irrelevant. So ACD would be satisfied by assuming that we are born with a lifetime supply of tokens that already have their nomic triggering conditions fixed.

But radical nativism is not a popular option in cognitive science. Though Fodor correctly points out that whether (or to what extent) nativism is true is an empirical question, it seems very unlikely to most researchers that the empirical facts will bear the theory out. Furthermore, if the project is to naturalize content, then all radical nativism does is open up new questions. We are now owed a naturalistic account of how it can be the case that an individual is born with a large stock of mental states that already have the appropriate nomic connections. Given the problems with both Dretske and Millikan's evolutionary accounts, it seems unlikely that such a story is forthcoming. Without the story, all we have reduces to the statement that UNICORN means unicorn because it has a set of properties that causes it to mean unicorn.

The Non-atomic Way Out

All three attempts to construct a theory of NCA seem to fail for unacquainted content. However there is still a way out that is consistent with a slightly weakened version of Conceptual Atomism. This solution, proposed by Fodor (1990: 124) and Dretske (1981: 222, 230) is to allow some concepts to be non-atomic, structured entities built out of atomic components.[11] So UNICORN, LENO, and so on actually unpack into phrasal entities in the language of thought, assembled out of primitive atoms. That is, they are *definitions*.[12] Fodor fails to provide any serious defense of the position, except to state that he thinks the situation in which a complex concept would be required is "*very, very rare*" (1990:124, his italics). Dretske proposes the same solution, but like Fodor, balks at defending it: "I hope [the compositional solution] is sufficiently plausible not to *need* argument" (1981:222, also his italics).

But contrary to Fodor, concepts with unacquainted content don't seem to be particularly rare at all. And contrary to Dretske, the definitional solution does need an argument, having been judged implausible, at least as a general account of conceptual structure, by a wide consensus of Cognitive Scientists.[13] Almost any standard account of the recent history of empirical research into conceptual structure begins with a recounting of the demise of so-called definitional theories (e.g. Komatsu, 1992; Laurence and Margolis, 1999; Smith and Medin, 1981). The most commonly cited reasons for abandoning of a definitional account of conceptual structure are that: a) there is a widespread consensus that most concept words of any interest are not rigorously definable (see Laurence and Margolis, 1999); b) no attempt to find psychological data that might reveal a definitional structure for simple lexical items has succeeded (e.g. Kintsch, 1974); and c) the well-established psychological phenomenon of typicality ratings, or "goodness of example" effects (e.g. R osch, 1973) is extremely difficult to account for within a definitional theory (see Smith and Medin, 1981).

Conclusion: A Better Way Out?

Dretske, Millikan, and Fodor have no solution to the problem of unacquainted content, unless we take one of two rather unpalatable options: a) accept a radical concept nativism in which tokens like UNICORN are an innate part of our psychological make-up; or b) accept that many concepts, including UNICORN, WOMBAT, LENO, and so on must have a definitional structure. Nobody seems wants to take option (a) seriously, and it begs the question anyhow, so we're left with option (b), which not only has no empirical support, but also contradicts the whole spirit of the Conceptual Atomist enterprise. What do we do now?

Recall that there are at least two projects here: the meta-semantic project of naturalizing content, and the psychological/semantic project of Conceptual Atomism. The first project is stalled by the problem of unacquainted content, and in attempting to save itself, has wreaked havoc on the second project. My suggestion is that we do not accept this conclusion, and that we separate the projects from now on. Let those interested in the meta-semantic

[10] There is a persistent notion that UNICORN must refer to an idea or to a representation. But a unicorn is not an idea or a representation; it's an animal that looks like a horse with a horn on its head. Ideas and representations are not animals and they have neither heads nor horns. So ideas and representations are the wrong sorts of things to serve as the content for UNICORN.

[11] Fodor proposes this (somewhat apologetically) only for cases of nonexistent objects, but it is easily extendible to any unacquainted content.

[12] "… the idea that many terms express concepts that have internal structure is tantamount to the idea that many terms have definitions." (Fodor, 1981: 289)

[13] Ironically, this consensus includes Fodor himself (e.g. Fodor, 1998; Fodor, Fodor and Garrett, 1975; Fodor, Garrett and Walker, 1980).

problem try to solve it on its own terms, and leave Conceptual Atomism to develop on its own. That way Conceptual Atomism can be consistent with itself in claiming that UNICORN and WOMBAT are atomic, just like DOG and COW. This is essentially the Language of Thought hypothesis (Fodor, 1975) with a referential semantics, but without the causal-historical meta-semantics. UNICORN refers to unicorns, but how, exactly, it comes to do that is an issue to be resolved (or not) by the separate project of meta-semantics.

I suspect that there will be some skepticism as to whether Conceptual Atomism can survive without its accompanying meta-semantic theory. Therefore, I will end with two reasons why I think that it can.

1. No competing theory is tied to a similar meta-semantic project. For example, neither the prototype theory nor the theory-theory of concepts attempts to say anything about how meaning arises from non-meaningful stuff. Neither do most modern versions of the definitional theory. And, after all, why should they? At this early stage, a psychological/semantic theory should be judged on its own merits, not by standards set at some other level of analysis.

2. Conceptual Atomism is still a decent theory even without the meta-semantic project. There is no psychological evidence for definitional structure, and the evidence that drives the prototype and theory theories can be accounted for within Conceptual Atomism – the former by supposing that typicality effects arise from a separate categorization mechanism, and the latter by supposing that people do have theories that guide their behavior, but that these theories are *about* the concepts they involve, rather than being *constitutive* of them. And above all, Conceptual Atomism is arguably one of the most natural fits to the computational theories of mind that are still so popular.

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